COCHISE COUNTY

CONTROL OF HAZARDOUS ENERGY PROGRAM
(Lock-Out/Tag-Out)

OSHA Regulation 29 CFR 1910.147

COCHISE COUNTY ADMINISTRATIVE PROCEDURE

CONTROL OF HAZARDOUS ENERGY PROGRAM

Initial Program: November 1, 1997 Program Revision: October 02, 2013

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CONTROL OF HAZARDOUS ENERGY (LOCK-OUT) PROGRAM
TABLE OF CONTENTS

PURPOSE

The Occupational Safety and Health Administration (OSHA) Control of Hazardous Energy Standard (Lock-Out/Tag-Out) 29 CFR 1910.147 covers the servicing and maintenance of machines and equipment in which the unexpected re-energizing or release of stored energy could cause injury to employees.

This program establishes a safe means of isolating machinery, equipment and systems to keep unauthorized employees or remote control systems from energizing the machinery or equipment during servicing or maintenance.

Since there is a much greater risk of employee injury when tag-out is used alone and a variety of heavy-duty rigid plastic lock-out adapter devices are available, the secondary control system (tag-out) has been deliberately left out of this program.

This program also defines responsibilities for implementing and controlling lock-out procedures.

SCOPE AND APPLICATION

Cochise County employees and contractors shall utilize lock-out procedures when equipment has the potential to release unexpected energy or hazardous chemicals. To avoid personal injury or property damage, County employees are prohibited from repairing, servicing, or cleaning equipment unless it is locked out. See Definitions in Appendix A.

"Authorized" employees are required to perform the lock-out in accordance with procedures included in this document. "Affected" employees operate equipment that is being serviced under lock-out, or whose job requires them to work in the area where such servicing is performed. Any employee, upon observing a machine or piece of equipment on which is locked out shall not attempt to start, energize or use that unit.

This program does not apply to work on cord/plug connected electrical equipment for which exposure to the hazards of unexpected re-energizing or start-up of the equipment is controlled by the unplugging of the equipment from the energy source and the plug is under the exclusive control of the employee performing the servicing or maintenance.

PROGRAM RESPONSIBILITIES

Cochise County Administration

- Provide safe work environment to its employees, contractors, and visitors and comply with related regulatory requirements.

Program Administrator (Risk Mgmt Analyst 520/432-9720)

- Establish the County's general written Control of Hazardous Energy (Lock-Out) Program and revise as necessary
- Coordinate an effective Lock-Out training program
- Function as a resource for Department Coordinators on Lock-Out topics
- Annually review departmental energy control programs with the Program Coordinators

Department Director/Elected Official

- Oversee the departmental Lock-Out program, ensuring that all of the program requirements are fully implemented

- Assign as Department Coordinator an employee(s) to be responsible for implementation of the Lock-Out program in that department. Provide the Department Coordinator(s) with adequate time and resources to implement the requirements of this program
- Enforce compliance with this program, including appropriate disciplinary action for any County employee failing to follow the requirements

Department Coordinator(s)

- In conjunction with area supervisors, survey area to identify machines/equipment which require lock-out during servicing/maintenance.
- Maintain an updated list of all departmental equipment/machines which are covered by the lock-out program (use Appendix B form).
- Ensure that Energy Control Procedures forms (Appendix C) are completed for each machine/equipment so identified.
- Coordinate lock-out training for departmental employees; document training using Appendices F-1 (Authorized Employee) and F-2 (Affected Employee).
- Annually inspect and review the effectiveness of the lock-out procedures. Review the lock-out procedure with all authorized employees, observing actual use of the procedure. Any deficiencies must be corrected immediately, either by modification of the procedure, re-training of employees, or a combination of both. Certify and document the inspection using the inspection form (Appendix E).
- Annually review the departmental energy control program with Program Administrator

Supervisors

- Complete Lock-Out Procedure form (Appendix D) to document specific procedures for each machine/equipment in the work group.
- Ensure that all required procedures are followed by all employees.
- Maintain an adequate supply of unique padlocks, *DANGER* tags, multiple-lock tongues, seals, and/or other similarly effective means for the lock-out process.
- Verify that employees have received training in energy control procedures prior to operating machinery/equipment and ensure that each employee and contractor engaging in work requiring lock-out understands and adheres to adopted procedures.
- Obtain a written copy of each contractor's Lock-Out program and advise County employees of those procedures.

Employees

- Follow specific procedures for each piece of machinery or equipment requiring lock-out.
- Maintain a supply of lock-out supplies in County vehicles/equipment or in the work area.
- Request clarification if unsure of the procedure.
- Participate in lock-out training and in reviews/inspections.

EDUCATION AND TRAINING

During New Employee Orientation, the Program Administrator will give a brief overview of the Cochise County Lock-out program and provide a copy of the County's general written program to potentially "authorized" employees and to other employees who request a copy.

Program Coordinators will ensure that authorized and affected employees are trained in the site-specific procedures, and will maintain all training documentation for at least the length of the employee's tenure (see Appendix F-1 and Appendix F-2 for training documentation forms).

Authorized employees are trained in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control.

Affected employees are instructed in the purpose and use of the energy control procedure, and the prohibition of attempting to re-start or re-energize locked-out machines or equipment.

Re-training will be conducted whenever there is a change in job assignment, a change in machinery or equipment, or a change in process that presents a new hazard.

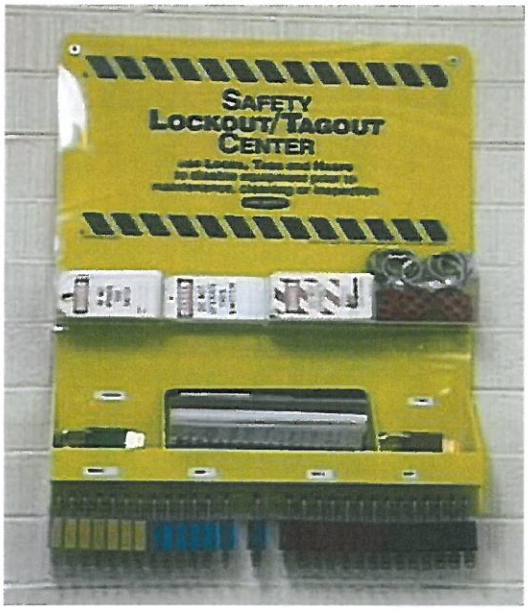
BASIC LOCK-OUT PRINCIPLES

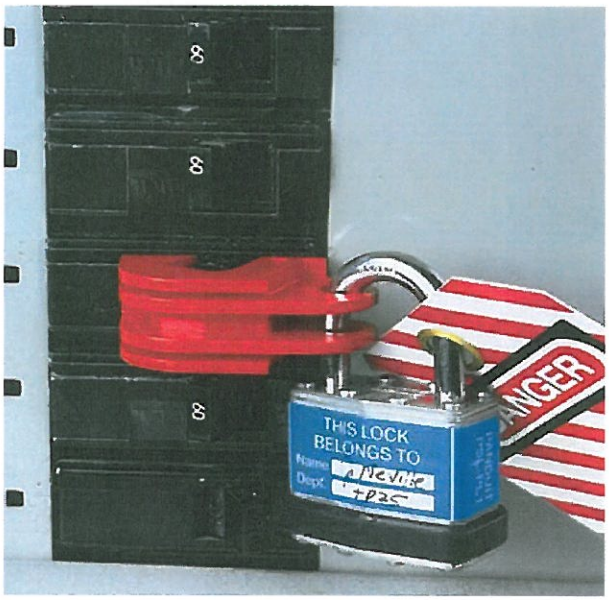
All equipment must be locked-out to protect against accidental or inadvertent operation, when operation could cause bodily injury.

No one should attempt to operate locked-out equipment.

Lock-out devices with an appropriate *DANGER* warning tag which hold an energy-isolating device in a safe position shall be used for energy control. The lock-out devices shall be:

- Durable – capable of withstanding the relevant environment for the maximum duration of expected exposure
- Standardized – color, shape or size. *DANGER* tags consistent in print and format.
- Substantial – tough enough to prevent removal without excessive use of force or unusual techniques (bolt-cutters or other metal-cutting tools)
- Identifiable – indicate the identity of the employee applying the device(s)





GENERAL LOCK-OUT AND RELEASE PROCEDURES

Lock-Out Sequence

1. Notify the area supervisor
2. Notify all affected employees when and why the lock-out is going to occur
3. If the machine/equipment is in operation, shut it down by the normal means

4. Operate the appropriate switch, valve, etc., so that the machine/equipment is isolated from the energy source
5. Lock the energy-isolating devices, using assigned locks and danger tags
6. Release, restrain or dissipate any stored energy
7. Verify that energy isolation is complete by attempting to start the affected machinery or equipment in the normal manner
8. Inspect the work area to ensure that non-essential items (tools, spare parts) have been removed and that all of the machine or equipment components are operationally intact
9. After testing, return all operation controls to the "neutral" or "off" position.

Restoration to Normal

1. After service or maintenance is complete, check the area to ensure that no employees are exposed
2. Remove all tools, excess parts and equipment used during the task
3. Ensure that all guards have been replaced and all safety interlocks are re-activated
4. Verify that the operating controls are in the "neutral" or "off" position
5. Remove all lock-out devices and tags, and activate the energy isolation devices to restore energy. Each employee removes only his/her own tag.
6. Advise affected employees that the machine or equipment has been re-energized

GROUP LOCK-OUT PROCEDURES

When servicing or maintenance is performed by more than one person, each authorized employee must place their own lock on the energy-isolating source. All locks and tags are to be left in place until all employees have finished their work. A lock is never to be removed except by the person who placed it there.

CONTRACTOR PROCEDURES

Contractors are to be advised by supervisors that Cochise County requires the use of lock-out procedures and that attempting to re-start or re-energize locked-out machines or equipment is prohibited. Department supervisors will obtain a written copy of the contractor's lock-out procedures and advise affected employees of that information.

SHIFT OR PERSONNEL CHANGE PROCEDURES

Supervisors must ensure the continuity of lock-out protection and ensure orderly transfer of lock-out device protection between off-going and on-coming employees. If the procedure lasts beyond one shift, the relief crew will apply their locks before the departing crew removes their locks.

PERIODIC INSPECTION PROCEDURES

At least annually, the Program Coordinators will conduct an inspection of each authorized employee under the lock-out procedure. The inspection will include a review between the inspector and each authorized employee of that employee's responsibilities under the lock-out procedure. The inspection will also consist of a physical inspection of the authorized employee while performing work under the procedures. Use Appendix E to document the inspection.

REMOVAL OF AN AUTHORIZED EMPLOYEE'S LOCK

Locks shall be removed by the employee who applied the lock. If that employee cannot be reached after a reasonable effort, the supervisor may remove the lock after advising all authorized employees present. The supervisor shall advise the authorized employee that their device has been removed before he/she resumes work on the affected equipment.

APPENDIX A
DEFINITIONS

Affected Employee:
Employee who either works with or in the area where lock-out procedures are performed.

Authorized Employee:
Employee who locks out machines/equipment to perform service/maintenance activities.

Energized:
Connected to an energy source or containing residual or stored energy.

Energy-Isolating Device
A mechanical device that physically prevents the transmission/release of energy, including but not limited to:

- A manually-operated electrical circuit breaker
- A disconnect switch
- A manually-operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors, and no pole can be operated independently
- A line valve, a block or a similar device used to block or isolate energy

Note: Push buttons, selector switches, and other control circuit type devices are not energy-isolating devices.

Energy Source:
Any source of electrical, mechanical, hydraulic, chemical, thermal, or other energy.

Lock-Out:
In accordance with established procedures, placement of a lock-out device on an energy isolating device to ensure that the machine/equipment cannot be operated until the lock-out device is removed.

Lock-Out Device:
Device, such as key/combination lock, with positive means to hold an energy-isolating device in the safe position and prevent the energizing of a machine or equipment.

Other Employees
All employees who are or may be in an area where energy control procedures may be utilized.

Servicing/Maintenance:
Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning, un-jamming, and making adjustments or tool changes where employees may be exposed to the unexpected re-energizing or start-up of the equipment or to the release of hazardous energy.

APPENDIX B
LISTING OF LOCK-OUT EQUIPMENT/MACHINES

The following machines/equipment fall under the requirements of 29 CFR 1910.147, the Control of Hazardous Energy.

Department: _____ Compiled by: _____

Equipment/Machine	**Location**	**Date**

APPENDIX C
ENERGY CONTROL PROCEDURES

Identify lock-out procedures involved when servicing/maintaining this equipment/machine

Equip/Machine name: _____ Dept: _____

Manufacturer: _____ Model #: _____

Location: (room/area) _____ City: _____

Written by: _____ Date: _____

Approving Supervisor: _____ Date: _____

CONTROLS

The following controls, including "start/stop" buttons, toggle switches, emergency stop buttons, shut-off valves, etc. have been identified for this equipment.

Control	Location on Equipment/Machine
☐ Main Disconnect	_____
☐ Emergency Stop Buttons	_____
☐ Pneumatic Valves (Ross, Ball)	_____
☐ "On-Off" buttons	_____
☐ Auto/ semi/ step mode switch	_____
☐ Automatic interlocks	_____
☐ Festo Valve	_____
☐ Other: _____	_____

Service/Maintenance Requiring Lock-out: _____

Energy Type (circle): Steam, Natural Gas, Moving Parts, Chemicals, Electric, Water, Vacuum, Pneumatic, Compressed Air, Hydraulic, Residual Energy, Thermal, Magnetic, Other: _____

Lock-out Device (circle): Switch, Valve, Block, Chain, Hasp, Other: _____

Energy Release Method (circle): Ground, Dissipate, Drain, Restraint, Other: _____

Lock-out Checklist

1. Complete ECP
2. Identify all Energy Sources
3. Notify all Affected Employees
4. Shut down the equipment
5. Isolate equipment
6. Apply lock-out devices
7. Reduce equipment to a zero state
8. Verify equipment isolation
9. Perform task
10. Remove lock-out device
11. Notify employees
12. Return equipment to service

Hazard	Action Required	Lock #	Name	Locks On date/time	Locks Off date/time

INVOLVED EMPLOYEES
These employees may be involved with the shutdown, servicing and re-start of this equipment.

"Authorized" Employees
☐ Maintenance Technicians ☐ Maintenance Supervisor ☐ Facility Technicians

☐ Other: _____ _____

☐ Other: _____ _____

Authorized employees must verify zero-energy state of equipment before beginning work.

"Affected" Employees
☐ Equipment Operators ☐ Supervisors ☐ Maintenance Technicians

☐ Other: _____ _____

☐ Other: _____ _____

TEMPORARY REMOVAL OF LOCK-OUT DEVICES

When lock-out devices must be temporarily removed from the energy isolating device and the machine/equipment energized to test or position it or a component, follow this procedure:

(1) Notify supervisor.
(2) Ensure that non-essential items, such as tools and parts, have been removed and that the machine/equipment components are operationally intact.
(3) Check the work area to ensure that all employees have been safely positioned or removed and inform affected employees that the machine, equipment or component will be temporarily energized for testing or positioning purposes.
(4) Each lock-out device shall be removed from each energy isolation device by the employee who applied the device.
(5) Energize and proceed with the testing or positioning.
(6) De-energize all systems and re-apply the shutdown procedures.

EQUIPMENT/STATION SEGMENT ISOLATION

When de-energizing a portion/section of a station or a piece of equipment to perform job responsibilities is necessary, apply the following steps:

PROCEDURE	LOCK-OUT DEVICE USED	HOW TO VERIFY
Refer to the shutdown procedures and use those that are applicable .		
Use appropriate energy isolating device(s).		

APPENDIX D
LOCK-OUT PROCEDURES

Machine/Equipment: _____

Lock-Out Sequence:

(1) Notify affected employees that servicing/maintenance is required on a machine/equipment and that the unit must be shut down and locked-out. ***Insert job titles of affected employees and how to notify them:***

_____

_____

_____

(2) Authorized employee refers to the Energy Control procedures to identify the type and magnitude of the energy the machine/equipment utilizes, the hazards of the energy and the methods to control the energy. ***List below:***

_____

_____

_____

(3) If the machine/equipment is operating, shut it down by the normal stopping procedure (depress the stop button, open switch, close valve, etc.) ***List type(s) and location(s) of machine/equipment operating controls.***

_____

_____

_____

(4) De-activate the energy-isolating device(s) so that the machine/equipment is isolated from the energy source(s). ***List type(s) and location(s) of energy isolating devices.***

_____

_____

_____

(5) Lock-out the energy isolating device(s) with assigned individual lock(s).

(6) Stored or residual energy (such as in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure) must be dissipated/restrained by grounding, re-positioning, blocking, bleeding down, etc. ***List type(s) of stored energy and methods to dissipate or restrain.***

_____

_____

_____

(7) Disconnect equipment from the energy source(s) by first checking that no one is exposed, then verify the isolation by operating the normal operating controls or by testing to make certain the equipment will not operate. Caution – return operating control(s) to neutral or "off" position after verifying the isolation. ***List method(s) of verifying the isolation of the equipment.***

_____

_____

_____

(8) The machine/equipment is now locked-out.

Restoring Equipment to Service

When the servicing/maintenance is completed and the machine or equipment is ready to return to normal operating conditions, follow these steps:

(1) Check the machine/equipment and the immediate area around the machine to ensure that non-essential items have been removed and that the machine/equipment components are operationally intact.

(2) Check the work area to ensure that all employees have been safely positioned or removed from the area.

(3) Verify that the controls are in neutral.

(4) Remove the lock-out devices and re-energize the machine/equipment. Note: Removal of some forms of blocking may require re-energizing of the machine before safe removal. See *Temporary Removal of Lock-Out Devices* in Energy Control Procedures (Appendix B).

(5) Notify Affected employees that the servicing/maintenance is completed and the machine/equipment is ready for use.

APPENDIX E
PERIODIC INSPECTION OF ENERGY CONTROL PROCEDURES

Authorized Employee Observed: _____ Date: _____

Equipment: _____ Location: _____

Procedure: _____ Inspector: _____

Hazardous Energies Involved:

Electrical: Voltage: _____ Chemical: _____ Vacuum: _____

Pressure (pneumatic/hydraulic): _____ Thermal: High Temp: _____ Cryogenics: _____

Stored: _____ Mechanical: _____ Ionizing Radiation: _____

Non-Ionizing Radiation: UV___ Infrared___ RF/Microwave_____ Laser____ Magnetic ____

Procedural Steps

Lock-Out the Equipment

1. Notified Affected Employees of LOTO (Yes) (No)
2. Identified all power disconnect points (list specific points) (Yes) (No)
3. Stopped or powered down equipment (Yes) (No)
4. Isolated equipment from all hazardous energies sources; listed isolation points. (Yes) (No)
5. Applied LOTO device(s) energy isolating device locked in OFF position. (Yes) (No)
6. Attached LOTO Tag to Lock (Yes) (No)
7. Dissipated, drained, or safely released stored or residual energy. (Yes) (No)
8. Blocked mechanical parts or removed mechanical links
9. Attempted to re-start machinery or re-energize equipment through normal means. Returned switch to OFF position. (Yes) (No)
10. Verified no hazardous energies present/isolated. Identify test equipment/meters. (Yes) (No)

Re-Energize the Equipment

1. Inspected work zone - clear of equipment, workers, tools & test equipment. (Yes) (No)
2. Unlocked and removed any blocking devices and replaced mechanical linkages. (Yes) (No)
3. Repositioned safety valve(s) left open to prevent re-buildup of pressure. (Yes) (No)
4. Checked all guarding and safety controls properly replaced. (Yes) (No)
5. Warned workers to stay clear of area. (Yes) (No)
6. Removed all locks and tags from energy control points. (Yes) (No)
7. Verified area clear of personnel. (Yes) (No)
8. Restarted/re-energized equipment. (Yes) (No)
9. Notified Affected Employees LOTO completed. (Yes) (No)

Comments/Deficiencies: _____

_____

_____

_____

The results of this inspection were discussed between the Authorized Employee being observed and the Inspector.

Signature of Authorized Employee Observed: _____

Date: _____

APPENDIX F-1
"AUTHORIZED" EMPLOYEE TRAINING RECORD

CONTROL OF HAZARDOUS ENERGY (LOCK-OUT) TRAINING
29 CFR 1910.147

Employee printed name:: _____ Date: _____

Department: _____ Building/Work Site/City: _____

I have attended the above Lock-Out training program which included the following:

___ Description of a energy control program and hazardous energy sources.

___ Why lock-out is necessary and functions covered by lock-out.

___ Steps for preparation of shutdown.

___ Performing shutdown according to the written energy control procedure.

___ How to isolate machinery from its energy sources.

___ The application of lock-out devices.

___ Procedures to release stored energy.

___ Verification procedures.

___ Procedures for restoring energy to the equipment or machine.

___ Lock-out devices to be used, and use and types of tags.

___ Procedures for group lockouts and for shift changes.

___ Procedures to remove a lock when the applying employee is not available to remove it.

___ _____

___ _____

Employee: _____ _____
Signature Date

_____ _____
Trainer (printed name) Trainer signature

APPENDIX F-2
"AFFECTED" EMPLOYEE TRAINING RECORD

CONTROL OF HAZARDOUS ENERGY (LOCK-OUT) TRAINING
29 CFR 1910.147

Employee printed name:: _____ Date: _____

Department: _____ Building/Work Site/City: _____

I have attended the above Lock-Out training program which included the following:

___ Description of an energy control program and hazardous energy sources.

___ Why lock-out is necessary.

___ Functions covered by lock-out.

___ Steps for preparation of the shutdown.

___ Authorized employee responsibilities.

___ Application of lock-out devices.

___ Release of stored energy.

___ Verification that equipment will not operate or release stored energy accidentally.

___ Restoring energy to the equipment.

___ Lock-out devices to be used, and type and use of tags.

___ Prohibitions for affected employees.

___ _____

___ _____

Employee: _____ _____
Signature Date

_____ _____
Trainer (printed name) Trainer signature